Buoyancy

**1.** Show students a brief video of a lava lamp ([**http://www.youtube.com/watch?v=pL5JHNUTml8**](http://www.youtube.com/watch?v=pL5JHNUTml8)**)** and atmospheric circulation

[**http://www.youtube.com/watch?v=KadsPCOudt0&feature=related**](http://www.youtube.com/watch?v=KadsPCOudt0&feature=related)

The instructor should point out that a lava lamp includes a light bulb in its base that heats the fluid.

A. List three ways that circulation in a lava lamp is similar to circulation in the atmosphere.

*1. They are both caused by buoyancy- a less dense material rising and a denser material falling.*

*2. In both cases, material is heated at the bottom and cools as it rises.*

*3. In both cases, the rate of circulation is affected by the temperature difference between the hottest and coldest regions.*

B. List three ways that circulation in a lava lamp is different from circulation in the atmosphere.

*1. The source of heat for the atmosphere is solar radiation while the source of heat for the lava lamp is electricity.*

*2. The material circulating in the lamp is liquid while the material circulating in the atmosphere is gaseous.*

*3. Earth rotates and this affect atmospheric circulation while lava lamps are usually stationary.*

**2**. Circulation in the atmosphere and oceans

A. List three ways that circulation of the atmosphere is like thermohaline circulation.

*1. They are both caused by buoyancy- a less dense material rising and a denser material falling.*

*2. In both cases, the warmest material is near the equator and the coldest material near the poles.*

*3. Both cause a transfer of heat from the equator towards the polar regions.*

B. List three ways they are different

*1. Circulation in the atmosphere is driven by temperature differences while thermohaline circulation is driven by both temperature and salinity differences.*

*2. The atmosphere is heated from below) heat irradiated from the earth’s surface but the oceans are heated from above (solar radiation striking the water surface).*

*3. Atmospheric circulation causes wind currents and winds affects oceanic currents but ocean currents have little affect on atmospheric wind currents.*

3. Imagine you have a very large tank of water and any other equipment you would like. How might you set up the tank and other equipment such that the water in the tank would circulate in a manner similar to thermohaline circulation in the oceans?